

IN THE CLAIMS

Cancel claim 1 without prejudice.

Please add the following new claims:

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~~--52. A picture encoding apparatus for encoding inputted picture data to generate a plurality of hierarchy data being a plurality of resolutions which are recursively different, comprising:~~

~~means for determining quantization characteristics of low hierarchy data being a resolution higher than that of upper hierarchy data being a low resolution, based on the activity of only said upper hierarchy data, in which the quantization characteristics of the low hierarchy data are different from the quantization characteristics of the upper hierarchy data; and~~

~~means for quantizing each of the hierarchy data in accordance with said determined quantization characteristics of each hierarchy.--~~

--53. The picture encoding apparatus according to claim 52, wherein:

said quantizing means comprises first quantizing means for quantizing the upper hierarchy data being a low resolution in accordance with first quantization characteristics; and second quantizing means for quantizing the low hierarchy data being a high resolution in accordance with second quantization characteristics; and

said determining means determines said second quantization characteristics for the low hierarchy data being a resolution higher than that of said upper hierarchy data being a low resolution, in accordance with said first quantization characteristics.--

--54. The picture encoding apparatus according to claim 53, wherein said

~~determining means determines, for each block of hierarchy data, a quantization step width for~~
said low hierarchy data based on a quantization step width of said upper hierarchy data.--

--55. The picture encoding apparatus according to claim 53, wherein said determining means detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data and determines a quantization step width of said low hierarchy data based on the distribution.--

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--56. The picture encoding apparatus according to claim 55, wherein said determining means multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a fixed value, so as to determine the quantization step width.--

--57. The picture encoding apparatus according to claim 55, wherein said determining means multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a linear weight, so as to determine the quantization step width.--

--58. The picture encoding apparatus according to claim 55, wherein said determining means multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a non-linear weight, so as to determine the quantization step width.--

--59. The picture encoding apparatus according to claim 53, wherein said determining means determines, for each block of hierarchy data, a quantization bit number of the low hierarchy data being a resolution higher than that of said upper hierarchy data, in accordance

with the quantization characteristics determined by the upper hierarchy data being a low resolution.--

B. --60. The picture encoding apparatus according to claim 59, wherein said determining means determines, for each block of hierarchy data, a quantization bit number of the low hierarchy data being a resolution higher than that of said upper hierarchy data, based on a quantization step width determined by the upper hierarchy data being a low resolution.--

50 50 50 --61. The picture encoding apparatus according to claim 60, wherein said determining means multiplies the quantization bit number of said upper hierarchy data by a value determined based on the quantization step width determined by said hierarchy data being a low resolution, so as to determine the quantization bit number of said low hierarchy data.--

--62. The picture encoding apparatus according to claim 59, wherein said determining means detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data to determine the quantization bit number based on the distribution.--

--63. The picture encoding apparatus according to claim 62, wherein said determining means detects, for each block of the hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization bit number of said upper hierarchy data by a value determined based on the distribution, so as to determine the quantization bit number of said low hierarchy data.--

--64. The picture encoding apparatus according to claim 59, wherein said determining means detects, for each block of hierarchy data, the distribution of the quantized

--65. The picture encoding apparatus according to claim 64, wherein said determining means detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization bit number of said upper hierarchy data by a value determined based on the distribution and the quantization step width determined by said hierarchy data being a low resolution, so as to determine the quantization bit number of said low hierarchy data.--

--66. The picture encoding apparatus according to claim 53, wherein:
said determining means determines, for each block of the hierarchy data, the
quantization characteristics of said low hierarchy data based on history information regarding the
determination of the quantization characteristics of said upper hierarchy data; and

said determining means determines a quantization step width of said low hierarchy data based on the history information regarding the determination of quantization step width of said upper hierarchy data.--

--67. The picture encoding apparatus according to claim 66, wherein said determining means detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data to determine the quantization step width of said low hierarchy data based on the distribution and the history information regarding the determination of the quantization step width of said upper hierarchy data.--

B_n ~~68. The picture encoding apparatus according to claim 67, wherein said determining means detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization step width of said upper hierarchy data by the value determined based on the distribution and the history information regarding the determination of the quantization step width of said upper hierarchy data, so as to determine the quantization step width of said low hierarchy data.--~~

BC ~~--69. The picture encoding apparatus according to claim 53, wherein each hierarchy data excepting data at the uppermost hierarchy is a hierarchy difference data which is a difference between the hierarchy data and the upper hierarchy data.--~~

~~--70. The picture encoding apparatus according to claim 53, further comprising means for generating the upper hierarchy data being a low resolution from the low hierarchy data being a high resolution, and wherein said generating means calculates, for each block of hierarchy data, an average of the pixel values having a number of n in a block to generate the upper hierarchy data; and the upper hierarchy data being the average and the low hierarchy data composed of the pixels having the number of n-1 in a block corresponding to the average are output as the encoded data.--~~

~~--71. The picture encoding apparatus according to claim 70, wherein each hierarchy data excepting data at the uppermost hierarchy is a hierarchy difference data which is a difference between the hierarchy data and the upper hierarchy data.--~~

~~--72. A picture transmitting method for encoding inputted picture data to transmit a plurality of hierarchy data being a plurality of resolutions which are different~~

~~recursively and transmitting the encoded data, said method comprising the steps of:~~

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determining quantization characteristics of the low hierarchy data being a resolution higher than that of said upper hierarchy data being a low resolution based on the activity of only the upper hierarchy data, in which the quantization characteristics of the low hierarchy data are different from the quantization characteristics of the upper hierarchy data;

quantizing each hierarchy data in accordance with said determined quantization characteristics of each hierarchy and generating the encoded data; and

transmitting said encoded data.--

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--73. The picture transmitting method according to claim 72, wherein:

said quantizing step comprises a first quantizing step of quantizing the upper hierarchy data being a low resolution in accordance with first quantization characteristics and a second quantizing step of quantizing the low hierarchy data being a high resolution in accordance with second quantization characteristics; and

said determining step determines said second quantization characteristics for the low hierarchy data being a resolution higher than that of the upper hierarchy data being a low resolution in accordance with said first quantization characteristics.--

--74. The picture transmitting method according to claim 73, wherein said determining step determines, for each block of hierarchy data, a quantization step width for said low hierarchy data based on a quantization step width of said upper hierarchy data.--

--75. The picture transmitting method according to claim 73, wherein said determining step detects, for each block of hierarchy data, the distribution of a quantized value of

~~said upper hierarchy data and determines a quantization step width of said low hierarchy data based on the distribution.--~~

--76. The picture transmitting method according to claim 75, wherein said determining step multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a fixed value, so as to determine the quantization step width.--

--77. The picture transmitting method according to claim 75, wherein said determining step multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a linear weight, so as to determine the quantization step width.--

--78. The picture transmitting method according to claim 75, wherein said determining step multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a non-linear weight, so as to determine the quantization step width.--

--79. The picture transmitting method according to claim 73, wherein said determining step determines, for each block of the hierarchy data, a quantization bit number of the low hierarchy data being a resolution higher than that of said upper hierarchy data, in accordance with the quantization characteristics determined by the upper hierarchy data being a low resolution.--

--80. The picture transmitting method according to claim 79, wherein said determining step determines, for each block of the hierarchy data, the quantization bit number of

~~the low hierarchy data being a resolution higher than that of said upper hierarchy data, based on a quantization step width determined by the upper hierarchy data being a low resolution.--~~

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--81. The picture transmitting method according to claim 80, wherein said determining step multiplies the quantization bit number of said upper hierarchy data by a value determined based on the quantization step width determined by said hierarchy data being a low resolution, so as to determine the quantization bit number of said low hierarchy data.--

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--82. The picture transmitting method according to claim 79, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data to determine the quantization bit number based on the distribution.--

--83. The picture transmitting method according to claim 82, wherein said determining step detects, for each block of the hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization bit number of said upper hierarchy data by a value determined based on the distribution, so as to determine the quantization bit number of said low hierarchy data.--

--84. The picture transmitting method according to claim 73, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data to determine the quantization bit number based on the distribution and a quantization step width determined by the upper hierarchy data being a low resolution.--

--85. The picture transmitting method according to claim 84, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization bit number of said upper hierarchy

~~data by a value determined based on the distribution and the quantization step width determined~~
by said hierarchy data being a low resolution, so as to determine the quantization bit number of
said low hierarchy data.--

--86. The picture transmitting method according to claim 73, wherein:

said determining step determines, for each block of hierarchy data, the
quantization characteristics of said low hierarchy data based on history information regarding the
determination of the quantization characteristics of said upper hierarchy data; and

said determining step determines a quantization step width of said low hierarchy
data based on the history information regarding the determination of quantization step width of
said upper hierarchy data.--

--87. The picture transmitting method according to claim 86, wherein said
determining step detects, for each block of hierarchy data, the distribution of the quantized value
of said upper hierarchy data to determine the quantization step width of said low hierarchy data
based on the distribution and the history information regarding the determination of the
quantization step width of said upper hierarchy data.--

--88. The picture transmitting method according to claim 87, wherein said
determining step detects, for each block of hierarchy data, the distribution of the quantized value
of said upper hierarchy data and multiplies the quantization step width of said upper hierarchy
data by the value determined based on the distribution and the history information regarding the
determination of the quantization step width of said upper hierarchy data, so as to determine the
quantization step width of said low hierarchy data.--

--89. ~~The picture transmitting method according to claim 73, wherein each~~

hierarchy data excepting data at the uppermost hierarchy is a hierarchy difference data which is a difference between the hierarchy data and the upper hierarchy data.--

--90. The picture transmitting method according to claim 73, further comprising the step of:

generating the upper hierarchy data being a low resolution from the low hierarchy data being a high resolution, and wherein:

said generating step calculates, for each block of hierarchy data, an average of the pixel values having a number of n in a block to generate the upper hierarchy data; and

said transmitting step transmits the encoded data corresponding to the upper hierarchy data composed of the average and the encoded data corresponding to the low hierarchy data composed of the pixels having the number of $n-1$ corresponding to the average.--

--91. The picture transmitting method according to claim 90, wherein each hierarchy data excepting data at the uppermost hierarchy is a hierarchy difference data which is a difference between the hierarchy data and the upper hierarchy data.--

--92. A picture encoding method for encoding inputted picture data to generate a plurality of hierarchy data being a plurality of resolutions which are different recursively, said method comprising the steps of:

determining quantization characteristics of the low hierarchy data being a resolution higher than that of said upper hierarchy data being a low resolution based on said activity of only the upper hierarchy data, in which the quantization characteristics of the low

~~hierarchy data are different from the quantization characteristics of the upper hierarchy data; and~~

quantizing each hierarchy data in accordance with said determined quantization characteristics of each hierarchy.--

--93. The picture encoding method according to claim 92, wherein:

said quantizing step comprises a first quantizing step of quantizing the upper hierarchy data being a low resolution in accordance with first quantization characteristics and a second quantizing step of quantizing the low hierarchy data being a high resolution in accordance with second quantization characteristics; and

said determining step determines said second quantization characteristics for the low hierarchy data being a resolution higher than that of the upper hierarchy data being a low resolution in accordance with said first quantization characteristics.--

--94. The picture encoding method according to claim 93, wherein said determining step determines, for each block of hierarchy data, a quantization step width for said low hierarchy data based on a quantization step width of said upper hierarchy data.--

--95. The picture encoding method according to claim 93, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data and determines a quantization step width of said low hierarchy data based on the distribution.--

--96. The picture encoding method according to claim 95, wherein said determining step multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a fixed value, so as to determine the quantization

~~step width.--~~

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--97. The picture encoding method according to claim 95, wherein said determining step multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value by a linear weight, so as to determine the quantization step width.--

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--98. The picture encoding method according to claim 95, wherein said determining step multiplies the quantization step width determined at said upper hierarchy based on the distribution of said quantized value of a non-linear weight, so as to determine the quantization step width.--

--99. The picture encoding method according to claim 93, wherein said determining step determines, for each block of the hierarchy data, a quantization bit number of the low hierarchy data being a resolution higher than that of said upper hierarchy data, in accordance with the quantization characteristics determined by the upper hierarchy data being a low resolution.--

--100. The picture encoding method according to claim 99, wherein said determining step determines, for each block of the hierarchy data, the quantization bit number of the low hierarchy data being a resolution higher than that of said upper hierarchy data, based on a quantization step width determined by the upper hierarchy data being a low resolution.--

--101. The picture encoding method according to claim 100, wherein said determining step multiplies the quantization bit number of said upper hierarchy data by a value determined based on the quantization step width determined by said hierarchy data being a low

resolution, so as to determine the quantization bit number of said low hierarchy data.--

--102. The picture encoding method according to claim 99, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data to determine the quantization bit number based on the distribution.--

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--103. The picture encoding method according to claim 102, wherein said determining step detects, for each block of the hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization bit number of said upper hierarchy data by a value determined based on the distribution, so as to determine the quantization bit number of said low hierarchy data.--

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--104. The picture encoding method according to claim 93, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data to determine the quantization bit number based on the distribution and a quantization step width determined by the upper hierarchy data being a low resolution.--

--105. The picture encoding method according to claim 104, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization bit number of said upper hierarchy data by a value determined based on the distribution and the quantization step width determined by said hierarchy data being a low resolution, so as to determine the quantization bit number of said low hierarchy data.--

--106. The picture encoding method according to claim 93, wherein:
said determining step determines, for each block of hierarchy data, the

~~quantization characteristics of said low hierarchy data based on history information regarding the~~

determination of the quantization characteristics of said upper hierarchy data; and

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said determining step determines a quantization step width of said low hierarchy data based on the history information regarding the determination of quantization step width of said upper hierarchy data.--

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--107. The picture encoding method according to claim 106, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data to determine the quantization step width of said low hierarchy data based on the distribution and the history information regarding the determination of the quantization step width of said upper hierarchy data.--

--108. The picture encoding method according to claim 107, wherein said determining step detects, for each block of hierarchy data, the distribution of the quantized value of said upper hierarchy data and multiplies the quantization step width of said upper hierarchy data by the value determined based on the distribution and the history information regarding the determination of the quantization step width of said upper hierarchy data, so as to determine the quantization step width of said low hierarchy data.--

--109. The picture encoding method according to claim 93, wherein each hierarchy data excepting data at the uppermost hierarchy is a hierarchy difference data which is a difference between the hierarchy data and the upper hierarchy data.--

--110. The picture encoding method according to claim 93, further comprising the step of: